Editorial

Forty years of unwarranted variation—And still counting

In 1967, fresh out of my medical training at Johns Hopkins, I took a job as director of Vermont’s Regional Medical Program (RMP) at the University of Vermont. The Vermont RMP was part of a national program, sponsored by the National Institutes of Health, whose goal was to ensure that all Americans had access to the great advances in medical care now available at academic medical centers. At Johns Hopkins, I had witnessed the advent of renal dialysis, chemotherapy, open-heart surgery and coronary intensive care units, and came to my new job with a good deal of enthusiasm for dealing with the underuse of medical care. But I also came as one trained in epidemiology and acquainted with the quantitative methods of the social sciences. It was thus quite natural for me to want to develop a database for identifying underuse of care among Vermont communities.

I worked with Alan Gittelsohn, a biostatistician from Johns Hopkins who had also been my teacher, to develop a method for comparing the population-based rates of care among neighboring hospital service areas. We called this the “small area analysis of health care delivery”. Our small areas were designed to maximize variation associated with differences in behavior of physicians according to the “market” in which they practiced. We first conducted a patient origin study that defined the geographic boundaries of local health care markets, of which there were 13 in Vermont, ranging in population size from just under 5000 to about 100,000. (In each area, the large majority of services were provided locally.) We then measured medical spending, resource inputs (such as physician labor and hospital beds), utilization of hospitals, nursing homes, physician services, diagnostic tests and surgical procedures, and, to the extent possible, medical need and outcomes.

The first view of the results brought a big surprise. While we had expected to find underservice in many parts of Vermont, we found instead a typology of care characterized by vast variations in the deployment of resources and the utilization of services among neighboring communities, without apparent rhyme or reason.

Here is a brief synopsis of what we reported in our first publication, the 1973 article in Science [1]:

- Extensive variations among Vermont hospital service areas in virtually all aspects of health care delivery, including physicians, hospital and nursing home beds and personnel, and expenditures. Hospitalization rates for most causes of admission varied two–to three-fold; common surgical procedures varied as much as ten-fold among areas.
- Physician supply appeared to influence demand (utilization). The specialty mix of physicians correlated with the mix of services provided to a defined population: populations living in areas with more surgeons per 10,000 have more surgery per 10,000 at all levels of complexity; areas with more general practitioners doing surgery have higher rates of less complicated surgery; populations living in hospital service areas with more internists per 10,000 undergo more diagnostic tests.
- The variation in physician supply (on a per capita basis) bore no apparent relationship to population need. Hospital service areas with older populations and lower per capita income had fewer physicians per capita.1 However, greater spending for hospitals and physician services showed no significant correlation with age-adjusted mortality and perinatal mortality.

We linked the practice variations uncovered in Vermont to professional uncertainty about the best way to practice medicine:

“The variations are more likely to be associated with differences in beliefs among physicians concerning the indications for, and the efficacy of, the procedure (than differences in the incidence of disease).”2

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1 A subsequent household interview that compared six Vermont hospital service areas with widely varying spending and utilization rates showed no differences in self-reported illness, insurance coverage, ethnicity, and income; on an annual basis, the proportion seeing their physicians were similar [2].

2 Direct evidence for the importance of physician opinion in influencing the rates of surgery was obtained by studying the changes in rates of tonsillectomy following feedback of data. The physicians in Morrisville
And, based primarily on the work of Archie Cochrane, uncertainty about best practice was linked to poor clinical science.

“An important reason for uncertainty is that few prospective clinical trials have been performed. Because the outcome of one type of service compared to another (or to none at all) is often unknown, the variations in therapeutic or diagnostic procedures observed among different Vermont communities cannot be strictly evaluated.”

As a consequence, we concluded, it wasn’t clear that more is better:

“(G)iven the magnitude of these variations, the possibility of too much medical care and the attendant likelihood of iatrogenic disease is presumably as strong as the possibility of not enough service and unintended morbidity and mortality.”

The uncovering of the Vermont variations led me to see that the problems facing the health care system were more profound than barriers to the diffusion of innovation the RMP was designed to address. Through mutual agreement with my overseers, I abandoned my post as a regional planner and took up research. Following the trail of unwarranted variation—variation that we couldn’t explain on the basis of illness, patient preference, or medical science—led to an interesting career; from work to characterize the amount and typology of variation; policy research on the question of “supplier-induced demand”; outcomes research to learn what works, what patients want and “which rate is right”; and the Dartmouth Atlas project as a strategy for using medical care epidemiology as a means for stimulating awareness and, possibly, social change [4].

Many others have, over the course of the past four decades, started to study these phenomena as well, not only in the US, but around the world, as this special anniversary issue of Health Policy demonstrates.

References


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changed their opinions on the value of this operation, resulting in a rapid decline in rates in that region [3].